

What is claimed is:

1. A monoclonal antibody which specifically binds to the extracellular domain of the PSCA antigen.
2. The monoclonal antibody of claim 1 which binds to native PSCA as expressed on the surface of a human cell.
3. The monoclonal antibody of claim 1 which inhibits the growth of tumor cells which express PSCA.
4. The monoclonal antibody of claim 2, wherein the antibody is internalized by the cell.
5. A monoclonal antibody of claim 1, 2 or 3 which comprises murine antigen binding region residues and human antibody residues.
6. A monoclonal antibody of claim 1, 2 or 3 which is a human antibody.
7. A transgenic animal producing a monoclonal antibody of claim 6.
8. A monoclonal antibody selected from the group consisting of (a) monoclonal antibodies 1G8, 2A2, 2H9, 3C5, 3E6, 3G3 or 4A10, produced by the hybridomas designated HB-12612, HB-12613, HB-12614, HB-12616, HB-12618, HB-12615, and HB-12617, respectively, as deposited with the American Type Culture Collection; (b) a monoclonal antibody which competitively inhibits the binding of any of the monoclonal antibodies of (a); and (c) a monoclonal antibody which has the antigen binding region residues of any of the monoclonal antibodies of (a).
9. A hybridoma producing a monoclonal antibody of claim 8.

10. A recombinant protein comprising the antigen binding region of a monoclonal antibody of claim 8.

11. An Fab, F(ab')₂ or Fv fragment of a monoclonal antibody of claim 1 or 8.

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12. An immunotoxin which is a conjugate of a cytotoxic agent and a monoclonal antibody of claim 1 or 8.

13. An immunotoxin which is a conjugate of a cytotoxic agent and a monoclonal antibody of claim 5.

14. An immunotoxin which is a conjugate of a cytotoxic agent and a monoclonal antibody of claim 6.

15. An immunotoxin which is a conjugate of a cytotoxic agent and a recombinant protein of claim 10.

16. An immunoconjugate comprising a molecule containing the antigen-binding region of the monoclonal antibody of claim 1 joined to a therapeutic agent.

17. The immunoconjugate of claim 16, wherein the therapeutic agent is a cytotoxic agent.

18. A method of inhibiting the growth of tumor cells expressing PSCA, comprising administering to a patient an antibody which binds specifically to the extracellular domain of PSCA in an amount effective to inhibit growth of the tumor cells.

19. The method of claim 18, wherein said antibody is conjugated to a cytotoxic agent.

20. The method of claim 19, wherein said cytotoxic agent is a radioactive isotope.

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20. The method of claim 18, wherein said cytotoxic agent is selected from the group consisting of ricin, ricin A-chain, doxorubicin, daunorubicin, taxol, ethidum bromide, mitomycin, etoposide, tenoposide, vincristine, vinblastine, colchicine, dihydroxy anthracin dione, actinomycin D, diphtheria toxin, *Pseudomonas* exotoxin (PE) A, PE40, abrin, arbrin A chain, modeccin A chain, alpha-sarcin, gelonin, mitogellin, retstrictocin, phenomycin, enomycin, curicin, crotin, calicheamicin, sapaonaria officinalis inhibitor, and glucocorticoid.

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21. The method of claim 19, wherein said radioactive isotope is selected from the group consisting of ^{212}Bi , ^{131}I , ^{131}In , ^{90}Y and ^{186}Re .

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22. The method of claim 17, wherein said antibody is not conjugated to a cytotoxic agent.

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23. The method of claim 17, wherein said antibody is a monoclonal antibody.

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24. The method of claim 23, wherein the monoclonal antibody comprises murine antigen binding region residues and human antibody residues.

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25. The method of claim 23, wherein the monoclonal antibody is a humanized antibody.

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26. The method of claim 23, wherein the monoclonal antibody is a human antibody.

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27. The method of claim 17, wherein the tumor cells comprise human prostate carcinoma cells.

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28. The method of claim 17, wherein the tumor cells comprise a metastasis of a human prostate carcinoma.

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29. The method of claim 17, wherein the tumor cells comprise human bladder carcinoma cells.

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30. The method of claim 17, wherein the tumor cells comprise a metastasis of a human bladder carcinoma.

~~31~~³² The method of claim ~~17~~¹⁸, wherein the tumor cells comprise human pancreatic carcinoma cells.

5 ~~32~~³³ The method of claim ~~17~~¹⁸, wherein the tumor cells comprise a metastasis of a human pancreatic carcinoma.

~~33~~³⁴ The method of claim ~~17~~¹⁸, wherein said antibody is a monoclonal antibody of claim 8.

10 ~~34~~³⁵ The method of claim ~~17~~¹⁸, further comprising administering to the patient a chemotherapeutic drug.

~~35~~³⁶ The method of claim ~~17~~¹⁸, further comprising administering radiation therapy to the patient.

15 ~~36~~³⁷ A method of inhibiting the growth of tumor cells expressing PSCA, comprising administering to a patient a combination of monoclonal antibodies which bind specifically to PSCA antigen in an amount effective to inhibit growth of the tumor cells.

20 ~~37~~³⁸ The method of claim ~~36~~³⁷, wherein the combination of monoclonal antibodies comprise monoclonal antibodies of at least two different isotypes.

~~38~~³⁹ The method of claim ~~36~~³⁷, wherein the combination of monoclonal antibodies comprise monoclonal antibodies with different epitope specificities.

25 ~~39~~⁴⁰ The method of claim ~~36~~³⁷, wherein the combination of monoclonal antibodies comprises monoclonal antibodies 1G8, 2A2, 2H9, 3C5, 3E6, 3G3 and 4A10 produced by the hybridomas designated HB-12612, HB-12613, HB-12614, HB-12616, HB-12618, HB-12615, and HB-12617, respectively, as deposited with the American Type Culture Collection.

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40. The method of claim 36, wherein the combination of monoclonal antibodies is selected from the group consisting of Mab A2, 2H9, 3C5, 3E6, 3G3 and 4A10 produced by the hybridomas designated HB-12612, HB-12613, HB-12614, HB-12616, HB-12618, HB-12615, and HB-12617, respectively, as deposited with the American Type Culture Collection.

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41. A method of treating a patient susceptible to or having a cancer which expresses PSCA antigen, comprising administering to said patient an effective amount of an antibody which binds specifically to the extracellular domain of PSCA.

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42. The method of claim 41 wherein said antibody is conjugated to a cytotoxic agent.

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43. The method of claim 42 wherein said cytotoxic agent is a radioactive isotope.

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44. The method of claim 42, wherein said cytotoxic agent is selected from the group consisting of ricin, ricin A-chain, doxorubicin, daunorubicin, taxol, ethidium bromide, mitomycin, etoposide, teniposide, vincristine, vinblastine, colchicine, dihydroxy anthracin dione, actinomycin D, diphtheria toxin, *Pseudomonas* exotoxin (PE) A, PE40, abrin, arabin A chain, modeccin A chain, alpha-sarcin, gelonin, mitogellin, retsictocin, phenomycin, enomycin, curicin, crotin, calicheamicin, saponaria officinalis inhibitor, and glucocorticoid.

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45. The method of claim 43, wherein said radioactive isotope is selected from the group consisting of ^{212}Bi , ^{131}I , ^{131}In , ^{90}Y and ^{186}Re .

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46. The method of claim 41, wherein said antibody is not conjugated to a cytotoxic agent.

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47. The method of claim 41, wherein said antibody is a monoclonal antibody.

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48. The method of claim 47, wherein the monoclonal antibody comprises murine antigen binding region residues and human antibody residues.

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~~49~~ The method of claim ~~47~~⁴⁸, wherein the monoclonal antibody is a human antibody.

~~51~~
~~50~~ The method of claim ~~47~~⁴⁸, wherein the monoclonal antibody is a humanized antibody.

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~~52~~
~~51~~ The method of claim ~~41~~⁴², wherein the tumor cells comprise human prostate carcinoma cells.

~~53~~
~~52~~ The method of claim ~~41~~⁴², wherein the tumor cells comprise a metastasis of a human prostate carcinoma.

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~~54~~
~~53~~ The method of claim ~~41~~⁴², wherein the tumor cells comprise human bladder carcinoma cells.

~~55~~
~~54~~ The method of claim ~~41~~⁴², wherein the tumor cells comprise a metastasis of a human bladder carcinoma.

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~~56~~
~~55~~ The method of claim ~~41~~⁴², wherein the tumor cells comprise human pancreatic carcinoma cells.

~~57~~
~~56~~ The method of claim ~~41~~⁴², wherein the tumor cells comprise a metastasis of a human pancreatic carcinoma.

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~~58~~
~~57~~ The method of claim ~~41~~⁴², wherein said antibody is a monoclonal antibody of claim 8.

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~~58~~ The method of claim ~~41~~⁴² further comprising administering to the patient a chemotherapeutic drug.

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~~59~~ The method of claim ~~41~~⁴² further comprising administering radiation therapy to the patient.

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~~60~~ The method of claim ~~41~~⁴², wherein said antibody is administered intravenously.

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~~61~~⁶² The method of claim ~~31~~⁵², wherein said antibody is administered directly into the prostate.

~~62~~⁶³ The method of claim ~~33~~⁵⁴, wherein said antibody is administered directly into the bladder.

5 ~~63~~⁶⁴ The method of claim ~~55~~⁵⁶, wherein said antibody is administered directly into the pancreas.

~~64~~⁶⁵ The method of claim ~~41~~⁴², wherein said antibody is formulated with a pharmaceutically acceptable carrier.

10 ~~65~~⁶⁶ A method for selectively inhibiting the growth of a cell expressing PSCA antigen comprising reacting the immunoconjugate of claim 1 with the cell in an amount sufficient to inhibit the growth of the cell.

15 ~~66~~⁶⁷ A method for selectively inhibiting the growth of a cell expressing PSCA antigen comprising reacting the immunotoxin of claim ~~12~~¹³, ~~13~~¹⁴, ~~14~~¹⁵, ~~15~~¹⁶, and ~~16~~¹⁷ with the cell in an amount sufficient to inhibit the growth of the cell.

20 ~~67~~⁶⁸ The method of claim ~~65~~⁶⁶ or ~~66~~⁶⁷, wherein the cell so inhibited is killed.

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